

CLAIMS

1. A gap fill material forming composition characterized in that the composition is used in manufacture of semiconductor device by a method comprising coating a photoresist on a substrate having a hole with aspect ratio shown in height/diameter of 1 or more, and transferring an image to the substrate by use of lithography process, and that the composition is coated on the substrate prior to coating of the photoresist, and comprises a polymer having a hydroxy group or a carboxy group and a crosslinking agent.
2. The gap fill material forming composition according to claim 1, wherein the polymer has a weight average molecular weight of 500 to 30000.
3. The gap fill material forming composition according to claim 1, wherein the polymer is a polymer containing repeating unit having a hydroxy group or a carboxy group in main chain.
4. The gap fill material forming composition according to claim 1, wherein the polymer is a polymer containing repeating unit having a hydroxy group or a carboxy group in side chain.
5. The gap fill material forming composition according to claim 1, wherein the polymer is a polymer containing acrylic acid or methacrylic acid as repeating unit.
6. The gap fill material forming composition according to claim 1, wherein the polymer is a polymer containing hydroxyalkyl acrylate or hydroxyalkyl methacrylate as repeating unit.
7. The gap fill material forming composition according to claim 1, wherein the polymer is a dextrin ester compound.
8. The gap fill material forming composition according to claim 1, wherein the polymer is a polymer containing hydroxystyrene as repeating unit.
9. The gap fill material forming composition according to any one of claims 1 to 7,

wherein the polymer has no aromatic ring structure in the structure.

10. The gap fill material forming composition according to claim 1, wherein the crosslinking agent is a crosslinking agent having at least two crosslink-forming functional groups.

11. The gap fill material forming composition according to any one of claims 1 to 10, further containing an alkali-dissolution rate regulator.

12. A method for forming a gap fill material layer for use in manufacture of semiconductor device comprising coating the gap fill material forming composition according to any one of claims 1 to 11 on a substrate and baking it.

13. A gap fill material layer manufactured by coating the gap fill material forming composition according to any one of claims 1 to 11 on a semiconductor substrate and baking it, in which the gap fill material layer has a dissolution rate for an alkaline aqueous solution having a concentration of 0.1% to 20% ranging from 3 to 200 nm per second.